

Monitoring of the Nepean River and its associated tributaries is undertaken in accordance with the approved Appin Area 9 Extraction Plan (EP). Monitoring is conducted by the Illawarra Metallurgical Coal Environmental Field Team (IMCEFT) monthly prior to mining and weekly during mining. Water quality and surface water levels are measured along with photographic and observational records. Longwall 904 began extraction 20 May 2021 and as of 12 September 2021 had extracted approximately 695m. During the latest inspection, one new gas zone was identified. 15 gas zones in total were active during the latest inspection (Figure 1 and Table 1).

#### **AA9\_LW904\_001 (E 289920, N 6213894)**

AA9\_LW904\_001 is a gas release zone on the Cataract River, approximately 100m upstream of the Nepean River and Cataract River confluence. The site is comprised of 6 light intermittent releases within a 60m<sup>2</sup> area (3m x 10m) (Photo 1). The site is approximately 3420m from the Longwall 904 goaf at its closest point.

AA9\_LW904\_001 is a Level 1 Trigger as per the Trigger Action Response Plan (TARP) in the Appin Area 9 EP: Annex B - Subsidence Monitoring Program (Appendix A, Table 2):

- Identification of strata gas plume of flow rate < 3000 L/min.



**Photo 1:** Gas release zone AA9\_LW904\_001 on the Cataract River. Taken on 9/09/2021.

Monitoring and reporting will continue as required by the EP. The following actions have been initiated:

- Continue monitoring program
- Submit an Impact Report to relevant stakeholders
- Report in the End of Panel Report
- Summarise actions and monitoring in the Annual Review

**Table 1:** Latest active gas release zones on the Nepean and Cataract River. Highlighted row refers to recently identified. Latest observations are based on inspection date 9 September 2021.

Site	Identification Date	Activating Longwall	Type	Trigger Level	Comment
AA7_LW701_Gas Zone4	16/01/2008	LW701	Gas Zone	Level 1	Gas Zone in Nepean River
AA7_LW703_Gas Zone10	21/05/2010	LW704	Gas Zone	Level 1	Gas Zone in Nepean River
AA9_LW901_005	7/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River
AA9_LW901_006	7/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River
AA9_LW901_007	15/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River
AA9_LW901_009	18/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River
AA9_LW901_010	18/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River
AA9_LW901_011	21/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River
AA9_LW901_012	21/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River
AA9_LW901_014	21/03/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River
AA9_LW901_018	21/04/2016	LW901	Gas Zone	Level 1	Gas Zone in Nepean River
AA9_LW901_026	31/01/2018	LW901	Gas Zone	Level 1	Gas Zone in Nepean River
AA9_LW902_007	15/08/2019	LW902	Gas Zone	Level 1	Gas Zone in Nepean River
AA9_LW903_001	23/04/2020	LW903	Gas Zone	Level 1	Gas Zone in Nepean River
AA9_LW904_001	9/09/2021	LW904	Gas Zone	Level 1	Gas Zone in Cataract River

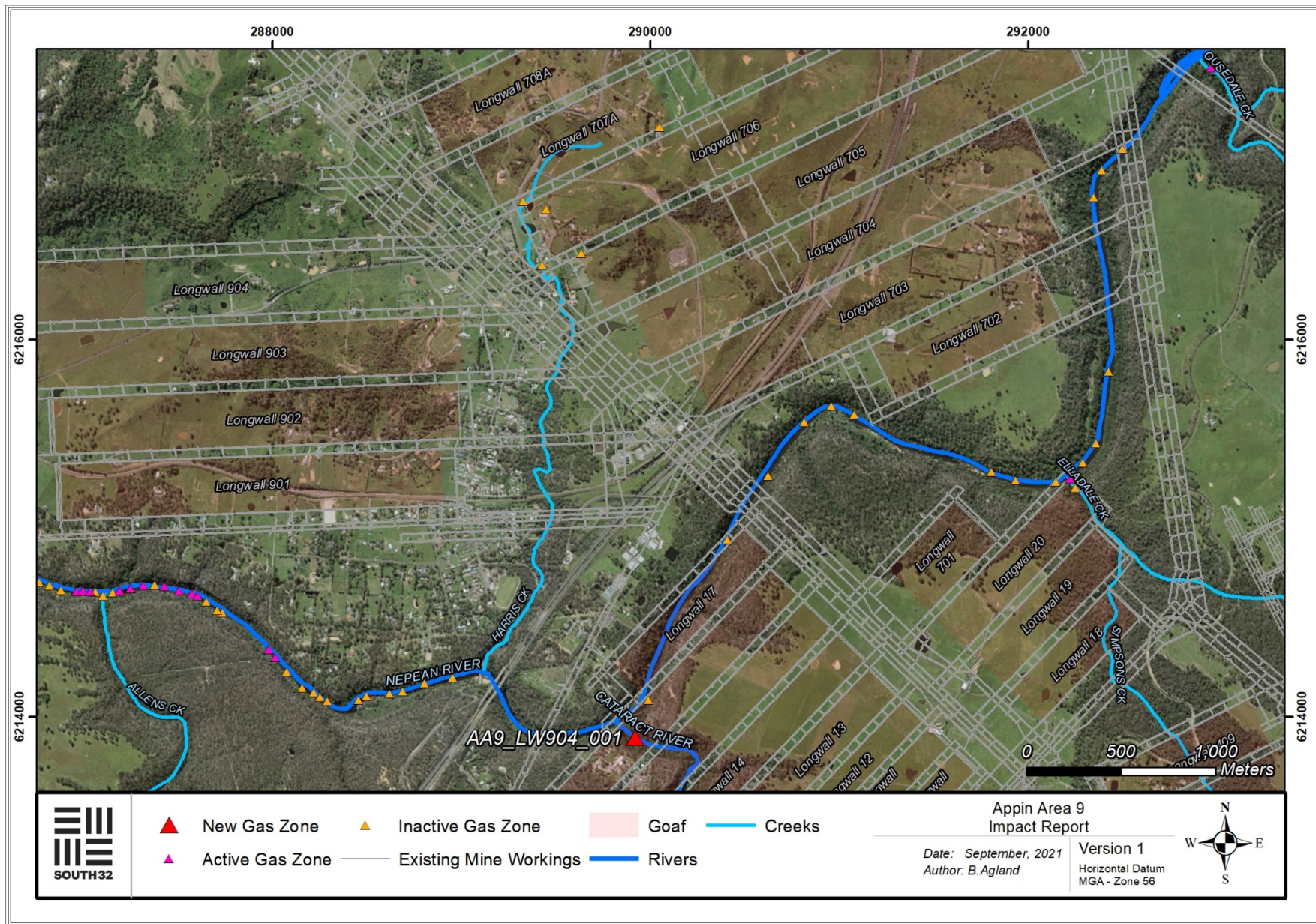


Figure 1: Gas zones on Nepean and Cataract River in relation to Appin Area 7 and 9.

**Table 2:** Extract from Appin Area 9 Trigger Action Response Plan.

Monitoring	Trigger	Action
<b>WATER QUALITY</b>		
Adjacent and downstream sites: <ul style="list-style-type: none"> <li>• Nepean River:               <ul style="list-style-type: none"> <li>– NR0</li> <li>– SW3 (NR1)</li> <li>– NR2</li> <li>– If and where strata gas emission plumes above 3000 L/min are detected</li> </ul> </li> </ul>	<b>Level 1*</b> Impact monitoring sites when comparing the baseline period to the mining period for that site: <ul style="list-style-type: none"> <li>• pH reduction greater than 1 standard deviation but less than 2 standard deviation from pre-mining mean resulting from the mining for two consecutive months</li> <li>• DO reduction greater than 1 standard deviation but less than 2 standard deviation from pre-mining mean resulting from the mining for two consecutive months</li> <li>• Identification of strata gas plume of flow rate &lt; 3000 L/min</li> </ul>	<ul style="list-style-type: none"> <li>• Continue monitoring program</li> <li>• Submit an Impact Report to OEH, DoPI, DPI and other relevant resource managers</li> <li>• Report in the End of Panel Report</li> <li>• Summarise actions and monitoring in AEMR</li> </ul>
	<b>Level 2*</b> Impact monitoring sites when comparing the baseline period to the mining period for that site: <ul style="list-style-type: none"> <li>• pH reduction greater than 2 standard deviation from pre-mining mean resulting from the mining for two consecutive months</li> <li>• DO reduction greater than 2 standard deviation from pre-mining mean resulting from the mining for two consecutive months</li> <li>• EC, total Fe and total Mn increases greater than 2 standard deviation from pre-mining mean resulting from the mining for two consecutive months</li> <li>• Identification of strata gas plume of flow rate &gt;3000 L/min</li> </ul>	<ul style="list-style-type: none"> <li>• Actions stated for Level 1</li> <li>• Review monitoring program</li> <li>• Notify relevant technical specialists and seek advice on any CMA required</li> <li>• Implement agreed CMAs as approved</li> </ul> <p><i>Note: CMAs are to be proposed based on appropriate management of environmental and other consequences of mining impacts i.e. water quality changes with insignificant consequences may not require specific CMAs other than ongoing monitoring to confirm there are no ongoing impacts</i></p> <p><i>Strata Gas Emission Plume:</i></p> <ul style="list-style-type: none"> <li>• Estimate gas emission flow rates. Re-estimate should significant change be observed</li> <li>• Take sample of plume (if possible) for:               <ul style="list-style-type: none"> <li>– chemical composition</li> <li>– dissolved methane from exactly above gas plume and at established downriver monitoring site</li> <li>– dissolved sulfide and total phenols from exactly above gas plume and at nearest downriver monitoring site</li> </ul> </li> </ul>
	<b>Level 3*</b> Impact monitoring sites when comparing the baseline period to the mining period for that site: <ul style="list-style-type: none"> <li>• Level 2-type reduction in water quality resulting from the mining observed for more than 6 consecutive months</li> </ul>	<ul style="list-style-type: none"> <li>• Actions stated for Level 2</li> <li>• Notify OEH, DP&amp;I, NoW, DPI, DRE, relevant resource managers and technical specialists and seek advice on any CMA required</li> <li>• Invite stakeholders for site visit</li> <li>• Develop site CMA (subject to stakeholder feedback)</li> <li>• Completion of works following approvals, including monitoring and reporting on success</li> <li>• Review the TARP and Management Plan in consultation with key stakeholders</li> </ul> <p><i>Note: CMAs are to be proposed based on appropriate management of environmental and other consequences of mining impacts i.e. water quality changes with insignificant consequences may not require specific CMAs other than ongoing monitoring to confirm there are no ongoing impacts</i></p>

Monitoring	Trigger	Action
	<p><i>Exceeding Performance Measures</i></p> <ul style="list-style-type: none"><li>• Mining results in more than negligible gas releases, iron staining or water cloudiness</li></ul>	<ul style="list-style-type: none"><li>• <i>Actions stated for Level 3</i></li><li>• Investigate reasons for the exceedance</li><li>• Update future predictions based on the outcomes of the investigation</li><li>• Provide environmental offset if CMAs are unsuccessful</li></ul>